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REPORT ON

EXPERIMENTS IN INDUCING ATTACKS OF D. PONDEROSAE

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EXPERIMENTS IN INDUCING ATTACK OF D. PONDEROSAE

In the report of last year's work on the Kaibab, the writer outlined a number of experiments in inducing attack. It was planned to try these experiments this year but the very low brood in the trees infested in 1925 made it apparent even early in June that such experiments would not be practical. The nearly total absence of 1926 attack made it impossible to conduct any experiments with fresh pitch tubes. This was a great disappointment as these particular experiments offered considerable promise of furnishing important biological data.

Several experiments were made by smearing trees near a center of emergence with fresh pitch. However, the emergence this year was so very light that there seemed little hope of positive results. These expectations were justified and none of the three trees treated with fresh pitch were attacked.

Eight trees were felled in the vicinity of Mile-and-a-Half near groups of trees killed in 1925. These were felled the last of July so as to be ready for the emerging beetles. Five of the eight trees were attacked but most of these showed only a very few attacks and none were "filled in" by parent beetles. No standing trees near these trap-trees showed any attack.

EXPERIMENT WITH BEETLES PLACED IN BARK CREVICES.

In the latter part of July the vicinity of Mile-and-a-Half was scouted to find a quarter section free of infestation but with infested trees adjacent to it. An approximate quarter section including the south half of the S.E. quarter of Section 19 and the North half of the N.E. quarter of Section 30 - R-1-E, T-37-N was finally chosen. This area contained but one infested tree. This was felled and examined. Only a very few - less than a dozen - brood were found but the infested length was thoroughly peeled.

A tree was then selected near the edge of a rather dense stand of yellow pine of fairly uniform age varying from 6" to 14" DBH. This tree was tall, very slender with very light crown, 10" DBH with thick corkey, ridged bark, increment of last half inch radius on North side 38 years. The tree was on the nearly flat top of a ridge with a slight east slope. It was shaded (Over topped) on the east and southeast but open to the sunlight on the southwest. A group of five infested trees occurred 580 paces W.N.W. and a group of 3 trees 350 paces S.W.

On the afternoon of July 29 a total of 532 beetles were placed in the bark crevices of this tree. The great majority of the beetles grasped the bark immediately and scurried into the nearest bark-crevice. A few "played possum" and fell to the cloth spread at the base of the tree. These were recovered and placed again upon the bark. Several beetles - not more than 3 or 4 - were observed to take wing and fly toward the sunlight (south west). These could be followed for 30 or 40 feet but then were lost to sight. Some of the beetles were sluggish - sick or injured - and it was difficult to get them to grasp the bark. Many of these probably died without entering the bark. The average size of the beetle was apparently considerable below the normal of other years and this deterioration in size was apparently correlated with a corresponding loss of vigor.

Considerably before the beetles had all been placed on the tree (which required nearly three hours, as each beetle had to be handled separately and very carefully placed so as to allow it to grasp the bark) the characteristic ticking sound made by the beetles in boring through the bark could be plainly heard. It is, therefore, certain that some of them at least started to bite the bark immediately.

The collecting of the beetles used in this experiment (532) required five days of effort on the part of Messrs. Edmonston, Hofer, and De Leon. They represented the brood from 15 or 20 trees. This illustrates the scarcity of young beetles at the time of emergence this year.

July 30, 1:30 p.m. Tree examined 24 hours after "planting" the beetles. Considerable bark dust in crevices of the bark shows that beetles are active from 6" above ground to as high as I could see. Most of the "sawdust" was red showing its origin from outer bark but some light yellow frass indicated that a few beetles were tapping the inner bark. The characteristic ticking sound could be distinctly heard on all sides of the tree, showing that many beetles were hard at work. A faint delicate odor of fresh pitch could be detected. There was no evidence of attack on adjacent trees.

July 31.

A distinct oder of new pitch - much stronger than yesterday was detected on approaching tree. "Sawdust" was seen to fall occasionally and "ticking" sound distinctly heard. Some agglutinated light sawdust was at base of tree. Seven pitch tubes were evident, but all were small indicating lack of vigor in tree. Several clerids - Enoclerus sphegeus - were observed creeping about over bark. One was kept under observation for some minutes. It would creep over bark for a few inches, then pause for several seconds - apparently listening, then proceed and repeat. It examined the bark crevices and twice partly entered a burrow but was unable to drag out its occupant. One clerid, however, was observed in the act of "man handling" a Black Hills Beetle. This is the only instance in observation extending over two summers that I have observed this clerid actually attacking Dendroctonus.

August 3.

Ten pitch tubes now present - 7 on south half and 3 on north half of tree. No clerids were seen.

"Tree A" five feet S.E. of planted tree shows 5 pitch tubes. This tree is 11" D.B.H., has light crown, intermediate bark, 50 feet clear of limbs, increment last half inch 17 years.

August 5.

No new pitch tubes. Old ones now producing agglutinated reddish sawdust except one. Much yellow in the bark crevices - from numerous burrows showing no pitch tubes - no clerids seen.

"Tree A" Seven pitch tubes now showing.

"Tree B" 7" DBH, very light crown, 50 ft. clear of limbs, their intermediate bark. 6 ft. E.N.E. of experimental tree. One pitch tube on south side 6" from ground.

"Tree C" 9" DBH, light crown, 50 ft. clear of limbs, medium thin corkey bark, 8 ft. E. of experimental tree. Two pitch tubes 4 ft. from ground.

August 10.

No change in experimental tree.

"Tree A" - 12 pitch tubes now present.

"Tree B" - 2 pitch tubes now present.

"Tree C" - No change.

August 13.

"Tree A" - 17 pitch tubes now present - 14 on North side, 3 on south side.

"Tree B" - 5 pitch tubes present.

"Tree C" - No change. Both attacks apparently pitch out.

August 25.

Experimental Tree - No new pitch tubes and only a few all together. But many attack without pitch tubes. Pityogens seen flying near tree apparently attracted by odor of pitch. One clerid seen wandering over bark.

"Tree A" - 18 pitch tubes in all.

"Trees B & C" Nothing new.

August 30.

Nothing new in any of the trees.

September 5.

Experimental tree examined by cutting into bark at several places 4-11 ft. from ground. Tree apparently dead. Larvae found in larval mines 1" long. Many entrace holes reamed out by clerids or other beetles.

No change in any of other trees.

September 8.

Cut experimental tree and peeled the bark to determine number of attacks and condition of brood. Twenty eight feet were more or less heavily infested - 56 square feet inside bark. Total attack 190 - 3.39 attack per sq. ft. attacking beetles 380.

The brood of the Black Hills Beetle seemed normally numerous. Some were just hatching while some were half grown with burrows 3½" long. Some unhatched eggs were present. The adults were usually two in a burrow and were mostly alive and still strong.

The basal portion of the trunk showed many burrows of D. approximatus and a few by D. convexifrons, Ips integer and Ips oregoni. The burrows of all of these bark beetles contained many scavengers.

September 10.

The surrounding trees were examined to see if any of the adults released in peeling the experimental tree had re-attacked other trees. No evidence of such attack was found.

SUMMARY

Only 190 attacks were found on the experimental trees. In addition 25 attacks occurred on adjacent trees, probably from beetles leaving the experimental tree. These 215 attacks represent theoretically 430 attacking beetles out of 532 beetles originally planted on the experimental tree. There is thus no evidence this year of any beetles being attracted into the experimental area by the activities of those planted, so that the object of the experiment failed completely due to the lack of emerging beetles.